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SURVEY OF HAZARDOUS TREES IN DEVELOPED SITES CHALLIS NATIONAL FOREST

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Max M. Ollieu[1] and LaGrand Hobbs[2]

INTRODUCTION

Personnel of the Challis National Forest requested Insect and Disease Control specialists to examine developed sites for pest related problems. The authors examined 33 sites in August and September 1976 which included most of the developed locations on the Forest. Data were recorded on important diseases and insects affecting the tree cover. Of greatest interest were those diseases and insects responsible for or associated with hazardous trees. Recommendations for management methods to minimize impact of diseases and insects at the sites were made to District personnel.

METHODS

Developed sites on the Challis National Forest were examined for defective trees. All trees which could fall onto improvements or locations where people would congregate within the developed sites were examined. Therefore, the boundary of the area examined around the sites varied depending on size of the tallest trees present. Data on both dead and green standing hazardous trees were recorded on a form designed by Landis and Johnson (1976). Trees determined to be hazardous were: (1) located by bearing and distance from known permanent objects, (2) recorded by type of defect/s, and (3) given a low, medium or high rating for hazard. In addition, comments about management of the stand to minimize forest disease and insect problems were provided and recorded.

All trees were visually examined first. Trees suspected of defect which could be hazardous were drilled when necessary with an increment borer or cut with an ax to examine rot and/or associated insects. Hazard ratings were arrived at by joint decision considering the probability of: (1) tree failure, (2) target impact, and (3) potential damage.

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RESULTS

A summary of data on green hazardous trees in the 33 developed sites visited on the Challis National Forest in 1976 is given in Table 1. Green trees determined to be hazardous totalled 121 or 3.6 per developed site: 1.0 highly hazardous, 1.2 of medium hazard and 1.4 of low hazard. Defects per green hazardous tree averaged 1.7 with leaning and butt rots most common. Root rot was present in 11 percent of the green hazardous trees (Figure 1). Eighty-six dead trees were found within the 33 sites or 2.6 per site. Total hazard trees per developed site was 6.2.

Further breakdown by District and site are given in Tables 2-5. Yankee Fork District had the most sites examined (18), greatest number of green hazard trees (76) and highest percent of green hazardous trees (4.2) per site.

Table 6 shows green hazard trees by species and diameter. Lodgepole pine was the most common green hazardous tree accounting for 80 percent of the total. Lodgepole averaged 11 inches diameter at breast height (DBH). Douglas-fir was the second most common tree (12%) and averaged 24 inches, DBH. Largest diameter tree species was cottonwood at 29 inches DBH.

Insects found associated with hazardous trees were mountain pine beetle, Dendroctonus ponderosae, pine engraver beetle, Ips sp., pine twig beetle, Pityogenes sp., Douglas-fir beetle, Dendroctonus pseudotsugae and carpenter ants, Camponotus sp. Mountain pine beetle, pine engraver beetle and pine twig beetle were associated with lodgepole pine mortality at 14 sites. Lodgepole pine were infected with shoestring root rot, Armillariella mellea, at three sites. All three sites had bark beetles associated with the mortality centers: pine engraver beetle at two sites and mountain pine beetle at the third site. Douglas-fir beetle was associated with mortality of Douglas-fir at two sites and carpenter ants were active in rotted butts of live trees at four sites.

At the Lola Camground, mountain pine beetle had caused strip kills of lodgepole pine from ground line up to approximately 12 feet on the bole. The injury had occurred decades earlier, possibly in the late 1920's or 1930's when mountain pine beetle were very active in the area. The wounds apparently were suitable openings for disease as 14 trees with this particular injury exhibited extensive butt rot at ground level.

Six green standing trees were extensively gnawed and undercut by beaver: 3 cottonwood at one site, 2 lodgepole at a second site and an aspen at a third site.

DISCUSSION

Each National Forest recreation and administrative site is to be given safety and sanitation inspections annually before the recreation season. All hazard trees and other unsafe and unsanitary conditions noted are to be corrected before the site is open for use. The objective is to take every reasonable precaution to protect the visiting public, Forest Service employees and improvements. Inspection of hazard trees will be conducted by a competent forester. (R-4 Supplement No. 54 to FSM 2331.32 dated May 1973.)

Based on the number of high hazard green trees (33) and dead trees (86) found, it would appear that the Challis National Forest needs to improve their management in this area.

Any hazard tree survey combines objectivity and subjectivity in reaching concurrence on potential hazard of any particular tree. A different crew would possibly have arrived at different conclusions on the hazard of trees in developed sites of the Challis National Forest. Green trees of high hazard rating mostly fell in three categories: (1) severe lean, (2) extensive butt rot, and (3) rotted roots. Most trees exhibited a combination of defects as they averaged 1.7 defects per tree.

Forest and District personnel will make the final decision on action to be taken with those trees determined as hazardous. We believe the benefits of their removal in most cases would far outweigh their being left in place. Action should be taken on those determined highly hazardous as soon as those particular developed sites are accessible.

Stocking within the various developed sites was for the most part adequate. Therefore, removal of green trees determined hazardous would have little esthetic impact. Additional removal of trees to improve the overall health of the stand should be given more consideration by the land manager. Table 7 illustrates recommended alternatives to manage stands in particular developed sites to lessen impact of dwarf mistletoe and stalactiforme canker. Sites affected are listed with the general recommendation to prune and thin stands lightly to moderately infected with dwarf mistletoe and to encourage native non-host regeneration or plant non-host seedlings in heavily infected stands. Where pruning and thinning are carried out, a 33-66 foot wide dwarf mistletoe buffer strip would be helpful to prevent dwarf mistletoe reinvasion of sanitized stands. Mistletoe reduces the general thriftiness of affected trees and can make them hazardous. Stalactiforme canker can also make trees hazardous. We would recommend that where possible, trees infected with stalactiforme canker be removed. Removal of stalactiforme infected trees would also reduce the local spore load within particular sites thereby reducing chances for further infection.

Figure 1. Green hazardous trees in developed sites on the Challis National Forest displayed a variety of defects or symptoms of defects: leaners - most common defect (upper left), sporophore of shoestring root rot (upper right), butt rot - second most common defect (lower left), stalactiforme canker (lower center), upper bole defect (lower right).

Lodgepole pine infested with mountain pine beetle and Douglas-fir infested with Douglas-fir beetle should be cut and burned or removed in the fall if possible to destroy brood and remove potential infestation sources from the site. Buildup of mountain pine beetle can be considerably lessened if lodgepole pine adjacent to developed sites can be cut back to an 8-9 inch diameter or smaller. Douglas-fir beetle is seldom a problem in stands less than 100 years old and less than 14-16 inches in diameter. Carpenter ants feed in decayed wood as was observed in the four green butt-rotted trees found infested during the survey. Mining by carpenter ants can lessen structural soundness somewhat but also help point out that a decay problem exists. Bark beetles and carpenter ants then, display beneficial characteristics such as was seen during the survey in pointing out root-rotted and butt-rotted trees.

RECOMMENDATIONS

(1) Remove green hazardous and dead trees detected by the survey.

(2) Conduct annual inspections of developed sites for hazardous trees and remove those identified as outlined in R-4 Supplement No. 54 to FSM 2331.32 dated May 1973.

(3) Keep records of hazard tree inspections and work completed as outlined in R-4 Supplement No. 54 to FSM 2331.32.

(4) Reduce dwarf mistletoe infections through pruning, thinning and/or favoring establishment of non-host tree species.

(5) Remove stalactiforme canker infected lodgepole.

REFERENCE

LANDIS, T. D. AND D. W. Johnson, 1976. Tree Hazards: Recognition and Reduction in Recreation Sites. Forest Service, Forest Pest Management, Technical Report R2-1, Lakewood, Colo. 8 pp.

Table 1. Green Hazard Trees by District, Type of Defect and Potential Hazard in Developed Sites, Challis National Forest, 1976.

District	Number of Developed Sites	Number of Green Hazard Trees	Type of Defect											Potential Hazard		
			Leaning	Uprooting	Root Rot	Butt Rot	Heart Rot	Basal Cavity	Weak Crotch	Limb Defect	Brooms	Mech. Injury	Other	High	Medium	Low
Challis R.D.	4	8	3		1	1	1		1	2		2	1	1	3	4
Middle Fk. R.D.	2	7	5		1	3						3		2	3	2
Lost River R.D.	9	30	16	4	1	6	2	1	1		4	3	8	9	10	11
Yankee Fk. R.D.	18	76	30		8	41	2	7	7	4	3	11	24	21	24	30
Totals	33	121	54	4	11	51	5	8	9	6	7	19	33	33	40	47
														1.0	1.2	1.4

Average green hazard trees per site = 3.6

Average dead hazard trees per site = 2.6

Total hazard trees per site = 6.2

Table 2. Green Hazard Trees by Type of Defect and Potential Hazard, Challis Ranger District, Challis National Forest, 1976.

Developed Site	Green Hazard Trees	Type of Defect											Potential Hazard		
		Leaning	Uprooting	Root Rot	Butt Rot	Heart Rot	Basil Cavity	Weak Crotch	Limb Defect.	Brooms	Mech. Injury	Other	High	Medium	Low
Big Creek	2	2							2		2			1	1
Mill Ck. Cpgd.	3			1	1			1					1	1	1
Morse Ck. Cpgd.	2	2													2
West Fk.	1					1						1		1	

Table 3. Green Hazard Trees by Type of Defect and Potential Hazard, Lost River Ranger District, Challis National Forest, 1976.

Developed Site	Green Hazard Trees	Type of Defect											Potential Hazard		
		Leaning	Uprooting	Root Rot	Butt Rot	Heart Rot	Basil Cavity	Weak Crotch	Limb Defect	Brooms	Mech. Injury	Other	High	Medium	Low
Fairview G.S.	0														
Iron Bog Cpgd.	7	4								3	1	3	1	3	3
Lorestica Youth Cp.	1							1							1
Mill Ck.Cpgd.	1				1						1			1	
Park Ck. Cpgd.	8	6	4									2	5	1	2
Phi Kappa	6	3		1	1					1		3		1	5
Store Hope	1				1									1	
Timber Ck.	1	1												1	
Wild Horse	5	2			3	2	1				1		3	2	

Table 4. Green Hazard Trees by Type of Defect and Potential Hazard, Middle Fork Ranger District, Challis National Forest, 1976.

Developed Site	Green Hazard Trees	Type of Defect											Potential Hazard		
		Leaning	Uprooting	Root Rot	Butt Rot	Heart Rot	Basal Cavity	Weak Crotch	Limb Defect	Brooms	Mech. Injury	Other	High	Medium	Low
Josephus Lake Cpgd.	5				3						3		2	2	2
Seafoam G.S.	1			1										1	

Table 5. Green Hazard Trees by Type of Defect and Potential Hazard, Yankee Fork Ranger District, Challis National Forest, 1976.

Developed Site	Green Hazard Trees	Type of Defect											Potential Hazard		
		Leaning	Uprooting	Root Rot	Butt Rot	Heart Rot	Basal Cavity	Weak Crotch	Limb Defect	Brooms	Mech. Injury	Other	High	Medium	Low
Bench Ck.	7	2		2	7	1	2					5	2	1	4
Banner Ck.	2	1									2		2		
Bayhorse Lk.	5	3			5		2						2	1	2
Beaver Ck. Cpgd.	4	3			2	1						1	2	1	1
Blind Ck. Cpgd.	4	3		2	2		1		1		2		2	2	
Custer Cpgd.	3	2			3			1			1		1	1	1
Flat Rock Cpgd.	3	2			2		1		2			1	1	1	1
Lola Cpgd.	20	7		4	14			4				1	7	9	4
Loon Ck. G.S.	2	1									1	2			2
8-Mile Cpgd.	0														
Monte Cristo Cpgd.	1	1							1						1
Pole Flat Cpgd.	13	1			1		1		1	1	3	8		5	8
Summit Rest Stop	1	1			1										1
Tin Cup Cpgd.	4	2			3						1		1		2
Thatcher Ck. Cpgd.	1											1			1
Upper Flat Rock Cpgd.	3									2	1	3	1	2	
Vader Ck. Rest Stop	1				1				1			1		1	
West Fork Cpgd.	1	1									1				2

Table 6. Average Diameters of Green Hazard Trees in Developed Sites, Challis National Forest, 1976.

Species	# of Trees	% of Total	Average DBH
Lodgepole pine	97	80	11"
Douglas-fir	15	12	24"
Cottonwood	4	2	29"
Engelmann spruce	2	2	19"
Subalpine fir	2	3	13"
Quaking aspen	1	1	8"

Table 7. Management Recommendations for Developed Sites with Dwarf Mistletoe and Stalactiform Infections, Challis National Forest, 1976.

District	Dwarf Mistletoe						Stalactiform Canker in LP
	Lodgepole Pine			Douglas-fir			
	L	M	H	L	M	H	
Challis R.D.							
Morse Ck. Cpgd.						E&P*	
Lost River R.D.							
Iron Bog Cpgd.			E&P				
Lorestica Youth Cp.	P&T**						
Park Ck.			E&P				Remove infected trees.
Phi Kappa			E&P				
Star Hope	P&T	P&T					
Middle Fk. R.D.							
Josephus Lake			E&P				
Yankee Fk. R.D.							
Banner Ck.	P&T						
Bench Ck.		P&T					" " "
Custer #1		P&T	E&P				
Loon Ck. Cpgd.							" " "
Monte Cristo Cpgd.					P&T		
Pole Flat Cpgd.			E&P				
Tin Cup Cpgd.							" " "
Thatcher Ck. Cpgd.							" " "
Upper Flat Rock Cpgd.		P&T					
West Fk. Cpgd.	P&T						" " "

* E&P - Encourage native non-host tree regeneration or plant seedlings if necessary.

** P&T - Prune and/or thin dwarf mistletoe infected branches and stems.